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OCTOBER 15, 1949

TECHNOLOGY DEPARTMENT

SCIENCE NEWS LETTER

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Oct 19 1949

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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A SCIENCE SERVICE PUBLICATION

\$5.50 A YEAR

VOL. 56 NO. 16 PAGES 241-256

MEDICINE

Mumps Mocks Chick III

► A BLOOD relation between mumps in humans and a serious poultry sickness, called Newcastle disease, has been discovered.

Half the patients recovering from mumps have in their blood factors which react against the virus of the poultry disease as if they had actually had this chicken sickness, Erwin Jungherr, Roy E. Luginbuhl and Lawrence Kilham, of the University of Connecticut and Harvard School of Public Health, report in the journal, *SCIENCE* (Sept. 30).

Newcastle disease has been reported spreading to human beings. So far, only five cases in humans that have been confirmed by isolation of the virus that causes it have been reported. The first two confirmed cases in the United States were discovered less than a year ago by Dr. W. L. Ingalls and Ann Mahoney of the College of Veterinary Medicine at Ohio State University.

The Connecticut and Harvard group warn that the diagnosis of Newcastle disease in humans should be made with caution, since their discovery that blood from recovering mumps patients may contain factors suggesting the person had the chicken disease.

The Ohio cases that were proved by isolating the virus occurred in a broiler plant operator and a junior veterinary student. The broiler plant operator came to the

poultry diagnostic laboratory at Ohio State University bringing several of his chickens for diagnostic purposes. While he was there, Dr. Ingalls noticed that the flock owner had a definite inflammation (conjunctivitis) of his left eye. The flock owner said he had had this for three days and that it started three days after sickness was noted among his chickens. A little of the pus in the corner of his eye was removed on a cotton swab and in this the virus of Newcastle disease was discovered.

The veterinary student apparently got his infection from chickens he was examining after they had died of the disease. Details of both these cases are reported in the *AMERICAN JOURNAL OF PUBLIC HEALTH* (June). Both patients recovered within a few days.

The eye inflammation is a typical symptom of the disease in humans. The nervous system and respiratory tract are also affected, according to a report from the American Veterinary Medical Association. Chief signs of the sickness in chickens, this association states, are a high death rate among the young chicks and a sharp reduction in laying rate among mature fowl.

The virus that causes the disease is said to resemble closely human influenza virus A and B. Vaccines are the chief means of combatting the disease among poultry.

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PSYCHOLOGY

Test Detects Alcoholics

► THE alcoholic addict can be distinguished from the social drinker by a simple paper-and-pencil test, Dr. Morse P. Manson, of the Birmingham Veterans Administration Hospital, Van Nuys, Calif., reports.

From the answers given by a man or woman to 60 simple yes-no questions, a physician can tell whether to advise the person never to touch liquor or whether it is safe for him to drink in moderation.

"I drink because I am unlucky in love." This is one of the items which sets the alcoholic addict apart from non-alcoholics and the social drinker. The alcoholic can think up many more reasons for his drinking than does the social drinker.

"A drink or two is the best way to get quick energy or pep," is another in this same category.

The alcoholic is a very emotionally immature person who is often hypersensitive, Dr. Manson found. Among the items that bring out this personality trait are the following:

"Drinking puts me at ease with people."

"I drink to get over my feelings of inferiority."

"A drink or two before a conference, interview, or social affair helps me very much."

"I take a drink or two before a date."

The alcoholic addict is a steady drinker and so he is betrayed by his answers to these statements:

"I often take a drink or two in the middle of the afternoon."

"I drink about a pint or more of whisky a week."

"I get drunk about every pay day."

The alcoholic is frequently an undersocialized individual who shuns social occasions. He prefers drinking over other activities. That is why he answers no to the following questions.

"I would rather go to a dinner or banquet than drink."

"I would rather attend a lecture or concert than drink."

"I would rather go to a movie than drink."

The addict cannot stop drinking once

he gets started and so these statements point him out:

"I go on a bender at least once a month."

"I usually pass out after I start drinking."

"I often have blackouts when I am drinking."

Men alcoholics appear to be more consistent drinkers and show stronger preferences for drinking than do women addicts. Women show much less control over their drinking, think up more reasons for their drinking and display more emotional immaturity than do men.

Dr. Manson's complete report appears in the *AMERICAN JOURNAL OF PSYCHIATRY* (Sept.).

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ELECTRONICS

One Electron Beam Controls Another Stream

► A NEW kind of electron tube promising advantages in television and radio has been developed at the famous Philips Lamp Works Research Laboratories, Eindhoven, The Netherlands. In it a beam of electrons controls another ribbon of rushing electrons, which are the smallest particles of electricity.

Other devices approaching the effect of this new tube have not given very large voltage differences, while the new tube is so positive that it is expected to have commercial usefulness.

So small is an electron that if one is sent across a beam of electrons the chance is very small it will pass close enough to any other electron to influence it or deflect it from its original path.

The two Philips scientists, J. L. H. Jonker and A. J. W. M. van Overbeek, worked out a small tube with grid, screen and conducting walls that allows one beam to lower the potential in the space where the other electron beam crosses. The passage of one stream can be modified or completely stopped by the other beam.

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PHYSIOLOGY-ANTHROPOLOGY

Living at High Altitudes Causes Racial Variety

► LIVING at the high altitudes of the Andean mountains may have brought about new racial characteristics in the Indians there, Dr. Carlos Monge M., Peruvian physiologist, has suggested.

The differences in the culture and in the behavior patterns of the Indians of Peru and Ecuador might be explained by the high altitudes, Dr. Monge told the Twenty-ninth International Congress of Americanists meeting in New York. Blood and chemical indexes for humans living at sea level, at 1000 feet and at extremely high altitudes were established by Dr. Monge.

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MEDICINE

Radiation Sickness Aid

Dramamine, the air and seasickness remedy, is being used to relieve patients suffering from sickness caused by X-ray and radium treatment.

► DISCOVERY of a new drug to help cancer and leukemia patients undergoing X-ray or radium treatment is announced by three Mayo Clinic doctors.

The drug is dramamine, the air and seasickness remedy and preventive which started out as a drug for hayfever patients.

Many patients who must have X-ray or radium treatment for life-threatening, deep-seated cancers or for leukemia get so sick from the radiation that the treatment which might save them has to be stopped. Vomiting, nausea, loss of appetite, weakness, exhaustion or prostration are the symptoms of the radiation sickness.

Good to excellent relief of these symptoms was obtained in 65 of 82 patients when they were given dramamine before and after the X-ray or radium treatment, the Mayo Clinic group, Drs. John W. Beeler, Jan H. Tillisch and Walter C. Popp, report.

Every one of the patients had previously had marked nausea from the radiation treatment and 53 of them had been vomiting as well. The dramamine was given to them in three doses: one pill half an hour to an hour before the radiation treatment, another an hour and a half after and a third three hours later. In four of the 13 patients who had a poor result from the dramamine, vomiting between doses made them unable to retain and absorb the drug.

In order to rule out any psychologic effect and make sure the good results were due to the drug, 23 patients with radiation sickness were given pills that looked just like dramamine and which they thought were dramamine but which actually were not. Only 13% of the patients in this group had good or excellent results, com-

pared to 79% in the group getting dramamine.

Of the 82 patients who got dramamine, 15 complained of feeling drowsy or sleepy and three refused to take the pills after three to four days of continued sleepiness. But several of the patients getting the substitute pill, or placebo, also complained of drowsiness and dizziness.

The striking likeness between the symptoms of air and seasickness or car sickness and radiation sickness is what led the Mayo group to try dramamine. Various other chemicals have been tried to relieve radiation sickness, including B vitamins and anti-histamine chemicals. Dramamine is an anti-histamine chemical, although there are other drugs with a more marked anti-histamine effect. In some cases, especially when the X-ray treatment is given over the upper part of the stomach region, a combination of dramamine and injections into the veins of vitamin B-6, or pyridoxine, gave better results, the Mayo doctors report, than either drug alone.

Just how dramamine works as both preventive and remedy for motion sickness is not known. It may have a specific depressing effect on the vomiting reflex. This would explain its action in both motion and radiation sickness, at least in checking the nausea and vomiting. This does not explain why it relieves other symptoms such as the malaise, prostration and lethargy or lassitude that occur in both radiation and motion sickness. These, however, may be secondary to the stimulation of the vomiting reflex.

"The action of dramamine," Dr. Tillisch suggests, "may be by means of relief of the primary and personally catastrophic symptoms of vomiting."

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proportions as are found in the population generally.

Babies afflicted with the hemolytic disease also belonged to the ABO blood groups in normal proportions. There was a suggestive increase in number of Rh-positive normal babies belonging to group A and a decrease in the number belonging to blood group O. The increase, however, was not statistically significant.

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MEDICINE

Rest in Bed Is Best Thing for Cold

► REST in bed is the best thing to do for a cold, your doctor will read in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 8).

Alcohol "in reasonable doses" gets an okay in the treatment of a cold because it causes small blood vessels to dilate and reestablishes circulation in chilled surfaces such as the skin and membranes lining the nose and throat.

Steam inhalations meet the "prime objective" of supplying moisture to the upper air passages during the earliest stages of a cold.

Cathartics, laxatives, fluids beyond the dictates of thirst, special diets, vitamins, oral vaccines and gargles are considered ineffective. Nose drops and aspirin properly used relieve symptoms but do not cure and should not be overused.

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HONORABLE MENTION—The photograph, which is a permanent record of the calibration of a half-inch ball bearing by the use of optical flats, won honorable mention in the black-and-white section of the 1949 Photography-in-Science-Salon held in Washington, D. C., Oct. 3-30.

MEDICINE

Rh Tied To Blood Group A

► WOMEN whose blood belongs to group A are more likely to be Rh negative and to give birth to babies with the dangerous hemolytic (blood-destroying) disease of the new born than women whose blood belongs to groups O, B or AB.

Figures showing this are reported by Drs. S. P. Lucia, Marjorie L. Hunt and John C. Talbot of the University of California School of Medicine in the journal, SCIENCE (Sept. 30).

Discovery of this relation between Rh

sensitization and blood group A was made in the course of studies on more than 11,000 pregnant women during the years 1943-1948.

In a sample of 228 sensitized Rh-negative women, 124 bore children afflicted with the disease. Of these 124, more than half, 66, belonged to blood group A. This is more than would be due to chance alone.

Sensitized Rh-negative women who bore normal babies, however, belonged to the different blood groups in about the same

MEDICINE

Cortisone May Speed Brain

► CORTISONE, hormone chemical which has brought new hope to arthritis sufferers, may cause a "speeding up" of brain activity.

Brain waves, the records of the electrical activity accompanying brain activity, suggesting this are reported by Drs. Edward W. Boland and Nathan E. Headley of Los Angeles in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Oct. 1).

The Los Angeles physicians were supplied with a small quantity of the scarce chemical by the manufacturer, Merck and Co. Trial in eight patients showed the same dramatic relief of arthritis reported with cortisone from the Mayo Clinic where it was discovered.

The extreme feeling of well being, technically termed euphoria, which the drug caused in addition to relieving pain, stiffness and disability, prompted the physicians to have brain wave records made of two patients before and after cortisone treat-

ment. In both cases there was an increase in alpha waves, suggesting that the chemical had caused a speed-up of brain activity.

Besides the marked improvement in severe arthritis while patients take large doses of cortisone, the Los Angeles physicians report that smaller doses helped three patients with less severe rheumatoid arthritis. The symptoms were "adequately but not completely controlled," they report.

The finding, though on a small number of patients, has a bearing on the practical side, the scientists point out, because the chemical "promises to be scarce and expensive in the immediate future." Besides suggesting that patients might be able to get along fairly well on smaller doses, with less expense, there would theoretically be less chance of dangerous side effects, if these develop when the chemical is given for a long time.

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process is not yet developed.

Copy tape may be any of the standard tapes now in use. The master record is made on a tape of extra high coercive force so that it will not be harmed by the transfer field. The copy tape is brought into contact with the master tape, and while the two are together they are passed through a high frequency magnetic field. The influx of the master record, combined with the high frequency field, impresses a faithful copy of the master record on the copy tape.

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SCIENCE NEWS LETTER

VOL 56 OCTOBER 15, 1949 NO. 16

48,300 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change, please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STATE 4439.

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ENGINEERING

Mass Record Duplication

► SOUND tracks for motion pictures recorded on magnetic wire, tape, film or disks, and all other magnetic recordings, can now be reproduced by a new duplicating process which operates at high speed. It makes mass production of recordings possible.

The new magnetic record duplicating process was revealed at the National Electronics Conference in Chicago, by Marvin Camras of the Armour Research Foundation of the Illinois Institute of Technology where it was developed. The Foundation has been one of the leaders in magnetic recordings. It is a recording system which utilizes, in-

stead of the "grooves" on the disks of familiar musical and other records, a magnetic metal the degrees of magnetism of which are made to vary along its length with the sound received. When played back, the magnetic variations produce vibrations in a diaphragm that result in an exact reproduction of the original sound recorded.

As explained by Mr. Camras, duplicate copies of any magnetic tape recording can be made at high speed by printing from a master tape, disk or endless belt which runs in contact with a copy tape. Duplicating a wire record has been done successfully in laboratory experiments, but an economical

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MINING

Coal Gas by Electricity

Fuel gases may now be obtained from unmined coal by sending an electric current through the coal as it lies underground.

► FUEL gases from coal as it lies underground in its natural seams have been successfully obtained by sending an electric current through the coal, the University of Missouri revealed in Columbia, Mo. The accomplishment was made near Hume, Mo., on property and with the cooperation of the Sinclair Coal Co.

As described by Dr. J. D. Forrester, chairman of the university's mining department, the process consists of making drill holes from the surface into a seam of coal lying below. Iron pipes are inserted into the holes to serve as electrodes. Connected with the electrodes is a series of pipes a few feet above ground through which the gas flows when it is generated.

A current of considerable voltage, controlled by a water rheostat, is sent down through the electrodes into the seam. In the process of passing through the coal and overcoming its electrical resistance, the coal is heated and begins to give off oil-saturated gas. This gas comes to the surface through the pipes that serve as electrodes. These pipes are 20 to 40 feet apart.

After the coal bed becomes sufficiently heated so that it will burn and yield other gases, the electric current is stopped and air or oxygen is pumped into the coked and porous coal seam to sustain further combustion. This continues the supply of gases from the actual gasification of the underground coal.

The gases produced by this so-called electrocarbonization process can be used as raw material from which to make synthetic gasoline, or can be converted into a heating fuel. The gas produced is similar to the coke furnace gas of surface plants. Field tests were preceded by laboratory experimentation during which it was proven that coal can be turned into gas by an electric current. Both laboratory and field work was done by Erich Sarapuu, a research fellow of the University's School of Mines and Metallurgy.

Several test runs on coal layers have been made during the past year. Some oil-tar has been collected at Hume along with the gas. In addition, laboratory investigation with oil-sand has resulted in the production of crude oil, as well as gas.

Fuel gases from underground coal are being successfully obtained by the U. S. Bureau of Mines in experimental work at Gorgas, Ala., in a joint project with the Alabama Power Company. No electric current is used, however, in the gasification process. Underground burning is employed.

Two holes are sunk into the coal seam,

and fire started in one by use of an incendiary bomb. Air under pressure is forced in to feed and spread the fire, and the gases of combustion are driven by the same air pressure to the second hole from the top of which they are captured. Some what similar work is being done in several European countries, particularly in Russia, where the scheme is said to have originated.

Electricity is used, however, in an oil-recovery process from oil shale in Sweden. A deep hole is drilled into the underground layer of shale, and an electrical heating element is lowered into the hole. The oil from the shale is driven off by the direct heat generated.

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MEDICINE

TB Helped by New Streptomycin Treatment

A METHOD of using streptomycin that may make the mold chemical more useful in treatment of tuberculosis has been discovered by Dr. Roger S. Mitchell of the Trudeau Sanatorium.

The usefulness of streptomycin, he points out, is "seriously limited" by the fact that the TB germs often develop resistance to the drug early in the course

of treatment of a patient. This makes the drug less effective as a remedy.

Doctors can avoid this, he believes, if they do not start giving the drug to patients with a cavity in the lung until the lung has been collapsed long enough to have a "satisfactory relaxing effect" on the cavity-bearing lung.

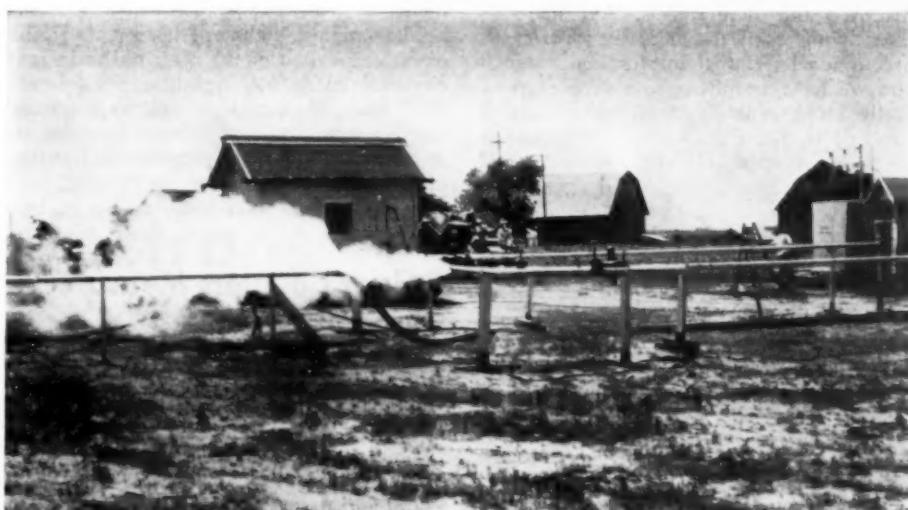
He bases this theory on the finding that streptomycin resistance rarely developed in the germs from patients who had no X-ray signs of cavities in their lungs before streptomycin treatment was started. Following this observation, a special study was made of 100 patients who still had TB germs in their sputum after the streptomycin treatment was completed. In 51 patients who had cavities and who did not get satisfactory lung collapse before streptomycin was started, 20, or 40%, had in their sputum, germs which were resistant to streptomycin at the end of the treatment.

But when no cavity was present at the start of the treatment, resistance to the drug developed in only three, or 11%, of 29 patients. And when cavity was present and satisfactory collapse of the lung established just before streptomycin was started, drug resistance developed in only two, or 10%, of 20 cases.

Although in some cases doctors may not wish to delay starting streptomycin treatment, Dr. Mitchell suggests that in the light of his observations on the patients, the value of utilizing at the same time the mechanical effects of collapse treatment with the effects of the drug on the germs "should be seriously considered."

Details of his study are reported in the NEW ENGLAND JOURNAL OF MEDICINE (Sept. 22).

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GASIFICATION TEST—Gas is escaping from the pipe sunk into the coal in the production of fuel gases from unmined coal by the use of electricity. This method eliminates the "cost of mining" factor.

AGRICULTURE

Tractors Fight India Weed

► A GREAT battle, with American heavy tractors, to free 3,000,000 acres of land from the strangle-hold of a gigantic weed-grass, promises to save millions of India's teeming population from starvation.

That's what India's \$10,000,000 World Bank loan is to be used for. In the never-ending war on hunger, it will be used to launch a seven-year campaign against the rampant plant pest called kans grass that renders a huge acreage in central India unfit for agriculture.

Kans grass, a prolific plant, is as thick around as the butt end of a billiard cue and puts down roots as deep as seven feet into the soil. Indian plows are unable to budge it. The only way to kill it is to pull it up by the roots and expose them to the sun. For this muscular job India is buying 345 American heavy tractors.

Indian agricultural experts believe that with the aid of this modern equipment the death-grip of kans will be broken. Like the American assault on the hedgerows of Normandy in the invasion of Europe, they will have to root out the deeply-entrenched

enemy field by field. After each skirmish, the dead plants will be hauled away, and the field will be immediately put to the plow. Spurred by the shadow of famine across their land, the Indians can not afford to lose time. As each field is cleared and plowed, wheat will be planted.

It will take seven years to rout kans grass from this huge potential breadbasket. When the campaign is over, India will turn her heavy tractors loose on the remaining millions of acres of farm land still occupied by kans grass. But that's for the future. This is a limited operation with limited objectives. But even on this limited scale the yield in food should go a long way to lessen the fearful pinch of hunger.

From the farmland which they expect to wrest from the grip of kans grass, in the first seven years alone they expect to garner 5,200,000 tons of wheat. Huge though this quantity is, India will still have to import large quantities of foreign grain. But with victory over kans grass, victory over hunger will be in sight.

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PHYSICS

Sun Future Energy Source

► THE sun, not the atom, may be the principal source of power for the world in future days, it was predicted at a meeting of the American Institute of Electrical Engineers in Dallas, Texas, by Frank R. Benedict of Westinghouse Electric Corporation, Pittsburgh.

Solar energy, he said, holds promise of supplementing our dwindling supply of coal, oil and natural gas, and may ultimately meet all the needs for power. It is common belief that in atomic disintegration we have an untapped source of practically inexhaustible energy, he continued, but this is not true. Limited amounts of the two fissionable elements, uranium and thorium, will control the broad scale applications of atomic power.

It seems very unlikely that atomic power will ever supply any large proportion of our total energy requirement, he asserted.

While "unrenewable" sources of energy such as coal, gas and oil now are our principal power sources, they can continue to provide all energy requirements for only another 100 to 300 years. Beyond that, the "continuous" sources, such as the sun's radiation, vegetation growth and waterfalls, offer chief hope.

To harness this energy, scientists still must devise means of capturing energy now lost when the sun's rays are reflected off the earth's surface. They also have to find out how to increase the amount of solar energy converted by the earth into

combustible materials such as wood, and the amount converted in the waters of the earth, causing water evaporation.

The water of our earth absorbs much of the sun's energy falling upon it. Most of the energy expended in evaporation is not recoverable. But the amount of energy that is theoretically recoverable is about 54 times our total energy requirements.

The engineer's dream, he stated, is the direct conversion of the sun's radiation into electrical energy. Along these lines, intensive research aimed at photo-chemistry, thermo-electricity and photo-electricity is now under way at Massachusetts Institute of Technology and other institutions.

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PHYSICS

Geiger Counters Measure Depth of Snow

► GEIGER counters are now being used to measure snow depths in Western mountains.

This technique was reported by Walter Wilson of the U. S. Weather Bureau at a symposium on mass and heat transfer from snow, lakes and ground surfaces held at the University of California at Los Angeles.

Actually the snow itself is not radioactive, but a bit of radioactive cobalt placed beneath it is. By recording how much the

clicking of the Geiger counter decreases or increases, the depth of the snow bank can be accurately determined.

Mr. Wilson, a member of the Weather Bureau's snow-investigating team which worked last winter in the High Sierra, said that the Geiger counter technique was the most successful of six methods of measurement employed.

Snow was an important item on the agenda of the two-day conference, sponsored by the U.C.L.A. engineering department. This was because, as Mr. Wilson indicated, mountain snow packs are the "primary sources" of Western rivers which supply many Pacific Coast cities with water.

The need for increasingly accurate methods of measuring evaporation and run-off was stressed. Without more accuracy in this respect, prediction of available water supply for Western cities is an uncertain affair, he pointed out.

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MINING

Synthetic Liquid Fuel Production Areas Sought

► MANY areas in the United States are suitable for plants for the manufacture of synthetic liquid fuel from coal, oil shale or natural gas as a raw material, recent surveys under government sponsorship show.

Desirable areas, in addition to the necessary raw material, must have plenty of water for plants of large capacity. If coal is the raw material, it should not be types of good coking quality because these are more valuable for other purposes.

Sample surveys already made cover portions of four states. These areas are in western Kentucky, where strip and underground coal are available; northeastern Colorado, with both oil shale and coal; southeastern Texas, with natural gas; and southeastern Montana with strip coal. No efforts were made in these surveys to select specific sites for plant construction. The objective was to determine general areas where all plant requirements can be met.

The surveys were made by the Army Corps of Engineers and by a commercial firm. This group, Ford, Bacon and Davis, Inc., of New York, has been awarded a contract for a nation-wide survey. Summary reports of the four surveys have been compiled by the Corps of Engineers and issued by the U. S. Bureau of Mines.

For detailed study and comparison, general areas within each of the four sample survey states were examined critically with reference to eight major factors, according to Dr. James Boyd, director of the Bureau of Mines. These include raw materials, water supply, power supply, access transportation, labor and housing, marketing, waste disposal facilities, and strategic considerations.

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ELECTRONICS

Color Television Progress

The all-electronic system of color television in which three colors are sent and received on the TV scope at the same time has been demonstrated.

► THE all-electronic system of color television which the Radio Corporation of America announced several years ago as forthcoming was demonstrated to members of the Federal Communications Commission and a group of scientists and press representatives in Washington, D. C. It is a system in which three primary colors are sent and received on the TV scope at the same time.

As explained by Dr. E. W. Engstrom of RCA Laboratories, this system requires no changes in present transmission standards. Transmitting stations can change at will, either from color to black-and-white or the reverse, without requiring adjustments to either the black-and-white or the color receiver and, therefore, without loss of audience.

Existing television sets will be able to receive in black-and-white programs transmitted in color without any modification whatever and without any converter or adapter. Existing black-and-white sets, however, will not be able to receive pictures in color without a special color adapter.

In this all-electronic system, a color camera at the transmitting end produces three signals, one for each of the three primary colors of green, red and blue. These signals are sampled electronically in rapid sequence and combined. The mixture is then broadcast as a single signal.

At the receiver, the mixture is separated, so that the signal representing each color goes to an electron tube which produces pictures in that particular color. Each is fed to its particular kinescope, and then the three colors are projected simultaneously to produce the completed picture in perfect color register.

PHYSICS

Wrong-Way Electrons

► TIME runs backwards for electrons bumped too hard in atomic collisions. For these wrong-way, upside down electrons, everything is backward. They start from where they haven't been, and they speed to the place they were just an instant ago, Prof. R. P. Feynman of Cornell University reports to the scientific journal, *Physical Review* (Sept. 15). Even their charge is backwards, being positive instead of negative.

Usually called positrons by physicists, these wrong-way electrons have long been a paradoxical problem to the theorists.

The RCA system is known as a simultaneous one because it sends the three primary color signals at the same time. The system of the Columbia Broadcasting Company is known as sequential because its colors follow one another onto the screen at high speed, so rapid that the colors affect the eye almost simultaneously. The CBS system has already been demonstrated before the Federal Communications Commission and at many places during the past year or two, including at medical meetings to permit doctors to witness by television actual surgical operations in hospitals. It is said to utilize scanning disks in a method somewhat similar to that used in colored motion picture.

At its demonstration, Dr. Peter C. Goldmark, inventor of Columbia's color television system, presented a tiny converter which will change black-and-white pictures to color. It will do this only on television receiving sets that have been adapted to receive color broadcasts in black-and-white.

The eight-ounce device contains a small motor which operates on household current. The motor whirls a tiny color disk containing the three primary colors, red, green and blue. The disk is synchronized with the color as broadcast. However, before this converter can be used, the receiving set must be adapted to color broadcasts in black-and-white.

Present TV sets can be modified to receive in black-and-white broadcasts over color TV channels at relatively low cost, David P. Smith of the Philco Corporation recently stated. But to take the modern black-and-white set and adapt it to receive color would cost between \$250 and \$273, he said.

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Nobody wanted them when they first turned up in the mathematical description of the electron that fitted in with the theory of relativity. At first they were an embarrassment to physicists because no one had ever seen such a particle. Later when pictures of positrons were found in some cosmic ray studies, sceptics had to take the theories seriously.

Usually when a speeding electron hits something, it is deflected in a new direction and continues on its way. However, if the electron is hit too hard, according to Prof.

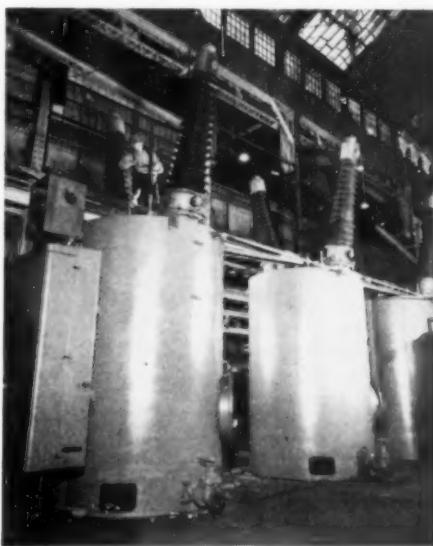
Feynman, the time-sense of the particle is reversed and it moves backwards in time. It is a positron.

These "turn-arounds" have often been seen in the laboratory, particularly in cosmic ray studies. Often two particle tracks come from the same spot in the picture, one particle with a negative and one with a positive charge. According to conventional description, an electron-positron pair is said to have been created at the point from which the particles emerge.

The new wrong-way electron description explains this process by saying that a positron, a wrong-way electron running backwards in time, has been bumped and turned into the right time direction, becoming a normal electron. No pair was produced, it was a turn-around.

Predestination takes a reverse twist in the new theory. It is quite possible for an electron to meet itself coming back from a place it hasn't yet been to. To point up this view, Prof. Feynman says "this view is quite different from that of the (conventional) Hamiltonian method which considers the future as developing continuously out of the past. Here we imagine the entire space-time history laid out, and that we just become aware of increasing portions of it successively." He also adds that the time order of events during a collision is irrelevant.

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CIRCUIT BREAKER—The 10,000,000 kilovolt-ampere circuit breaker will assure hair trigger control of the tremendous electrical energy generated at Grand Coulee Dam. When the tanks are filled with oil, the giant assembly built by Westinghouse Electric Corporation will interrupt the flow of power in one-twentieth of a second.

AERONAUTICS-AGRICULTURE

Airplane Is Economical Farm and Forestry Tool

► THE airplane is proving itself as an economical and efficient farm and forestry tool, officials of the U. S. Department of Agriculture in Washington, D. C. stated. In spraying operations, a single plane treated in a half-hour an area seven or eight times as great as would have been covered by a ground crew in a normal spray season of about six weeks.

Reseeding a burned-out forestry area cost half the amount that would have been required by hand in an airplane reseeding test made in the winter of 1948 on a severely burned area in York county, Maine, following the disastrous forest fires of the preceding fall. It was a test by the U. S. Forest Service to determine the most economical way of restoring burned acreage.

In the Maine reseeding, white pine seed was used. To get good distribution on the ground, the seed was mixed with from three to ten times its bulk in sawdust. The seeding was done while snow was on the ground, an effective procedure to protect the seed from the small rodents who are likely otherwise to eat much of it. First season counts show a fairly satisfactory germination. Forestry officials predict that airplane reseeding may prove to be a cheap method of quickly restocking the large severe burns that occur occasionally in the United States.

In a 1949 spraying test against the gypsy moth made in northeastern states, the spray was a concentrated formulation blown out in fine droplets. It was a cooperative experiment, with entomologists of the U. S. Department of Agriculture working with local state officials.

The economy and effectiveness of this newly developed method of control, government agents said, offer the best hope for practical control of several forest pests. A principal advantage is the ability to cover a great area within the short season during which the insecticide is effective against some stage of the particular insect pest. The quantity applied in forest protection, sometimes as little as two quarts to the acre, has relatively little effect on other life in the area, birds, fishes, and beneficial insects, government entomologists assert.

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AERONAUTICS

Turbo-Jets Will Fly 500 Miles Per Hour

► TRANSPORT planes of 1955 will be powered by four turbo-prop engines, will carry from 50 to 58 passengers on flights from 830 to 3,500 miles, will fly at 35,000-foot altitudes, and will travel at some 500 miles an hour, it was predicted at

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the meeting of the Society of Automotive Engineers in Los Angeles, Calif.

Instead of turbo-props, turbo-jets may be used. The turbo-prop uses a gas turbine to give one-way rotation to a shaft to which conventional bladed propellers are attached. The turbo-jet is the jet-propulsion engine. Part of the high-pressure gases generated are used in a turbine to power the compressor which provides air for combustion.

The present reciprocating engine may be outmoded by 1955, the turbo-propeller engine well advanced, and the turbo-jet coming into its own, the engineers were told by Donald S. Jordan of Pratt and Whitney, East Hartford, Conn. He predicted that turbo-jet engines might be larger and quite different from those now in use.

Transports of 1955 will have to operate from local airports as well as from major air terminals to build up volume business, according to Carlos Wood, Douglas Aircraft Co., Santa Monica, Calif. Their extreme range needs to be about 3,500 miles, the distance from America to Europe.

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MEDICINE

Radar Device Helps Detect Gallstones

► SURGEONS in the future will be able to use a radar device to detect and locate gallstones, bullets, shell fragments, bits of glass or wooden splinters in the body if a technique developed at the Naval Medical Research Institute, Washington, D. C., proves as successful in practice as it has in the laboratory.

By this technique, ultrasonic energy (high frequency sound waves), generated by a quartz crystal, are transmitted into the body tissue from the instrument in direct contact with the skin. Reflections of these waves occur from the bones, and from any foreign substance that possesses different acoustical properties from the surrounding tissues. Thus, a gallstone, a shell fragment, a bullet, a piece of glass or a wooden splinter will reflect a portion of the energy that strikes it. The reflected waves are transformed into electrical pulses, which are then amplified and displayed on a cathode ray oscilloscope screen.

In this way a foreign body which may or may not be visible by X-ray, appears on the screen as an "echo," in much the same manner as a plane in the sky appears on a radar screen. The distance of the echo from the initial pulse gives the depth of the foreign body in the tissues.

The method was developed by Dr. George D. Ludwig of the Naval Medical Research Institute in collaboration with the Harrison department of research surgery at the University of Pennsylvania.

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IN SCIENCE

AERONAUTICS

Stresses in Jet-Powered Speedy Planes Studied

► THE terrific stresses in airplanes resulting from the use of powerful, high-speed jet-engines are responsible for more intensive investigations now underway to determine whether military planes are strong enough to withstand them. The study is spear-headed at the Wright-Patterson laboratories of the U. S. Air Force, Dayton, Ohio, but the nation's best aircraft designers will help.

Just started is an investigation into the structural flight loads, characteristics and limits of two modern jet fighters, the F-80 and the F-84. The program is planned to include two bombers, the jet-powered B-45 and the reciprocating-engine-powered B-50. A contract has been awarded the Curtiss-Wright Corporation, Columbus, Ohio, to install measuring devices with which to obtain control surface loads and related time histories of surface position and airplane attitude.

More than 30 channels of information will be collected on an automatic recording oscilloscope, Curtiss-Wright officials said. They will show complete control position, strains, air speed, angle of attack, temperature and other factors affecting the airplane's flight.

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ENGINEERING

Possible Future Lighting System Uses Plastics

► LUMINOUS ceilings, made of plastic through which glareless light comes, may be the lighting system of the future.

Mounting many lamps behind a translucent plastic is the most completely adequate way of lighting a room, a special committee on lighting at Massachusetts Institute of Technology reported in Cambridge, Mass.

Luminous ceilings are made by hanging fluorescent lamps from a ceiling that has been painted white. About a foot below the lights, covering the whole ceiling, is a thin sheet of plastic that allows the light to gleam through.

Another suggested way of achieving the same lighting effect is to use special overhead head light fixtures. These are two half-cylinders, an upper one of transparent plastic and a lower one of diffusing plastic. When looking up at a ceiling thus lighted, both the lamps and the ceiling itself appear to have the same brightness.

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SCIENCE FIELDS

GEOLOGY

Prospecting from Air 100 Times Cheaper

► MODERN mineral prospecting is 500 times faster and 100 times cheaper than it was before the war. The "astounding developments" that make this possible spring from World War II, just as the two earlier chapters in prospecting history were preceded by great wars.

World War II produced improvements in geologic instruments and planes suitable for carrying them. In three hours such a specially-equipped plane can survey 450 miles of terrain. A team of men on the ground would have to put in a full day to survey about a mile.

These statements were made by Dr. Hans Lundberg, president of Lundberg Explorations of Toronto, before geologists assembled to celebrate the seventy-fifth anniversary of the Colorado School of Mines in Golden, Colo.

Because "it has now become possible to realize the prospector's dream of geophysical exploration from the air," Dr. Lundberg said, "geologists will be able to discover the mineral possibilities of the large unexplored areas of the earth."

American prospecting, Dr. Lundberg declared, falls into three distinct periods, each with its own methods, and each "preceded by a Great War." The wars referred to are the Civil War and the two World Wars.

By combining aviation and electronics the present striking savings in time and money have been accomplished, he said. The post-Civil War period was a pick-and-shovel era, prospectors were mostly wandering Civil War veterans, and discoveries were mostly luck. Some experienced prospectors in time "developed an ore-finding sense," Dr. Lundberg said, but this random skill did not become organized into a science until after the first World War.

In this second phase scientific prospecting came of age. Sensitive instruments for measuring gravitational and magnetic pull and electrical impulses were developed. The necessity for moving this equipment from place to place on the ground was time-consuming and costly. Moreover, ground readings must be taken at intervals of 50 feet or so, whereas air surveys give continuous measurements.

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AERONAUTICS

On Again, Off Again Will De-Ice Planes

► INTERMITTENT heating is more efficient than continuous heating for de-icing

airplane surfaces such as wings and propellers under extremely heavy icing conditions.

So says Dr. Myron Tribus of the University of California at Los Angeles department of engineering.

Although intermittent heating has been used for some time in the de-icing of propeller blades, heavier and more costly continuous heating devices are used for de-icing the other plane surfaces.

Dr. Tribus' studies at U.C.L.A. show that in intermittent heating the formation of ice liberates heat which can be utilized. Continuously-heated surfaces are constantly above freezing and thus are not able to take advantage of the heat liberated by the fusion of ice.

Intermittent heating, therefore, is thermodynamically more efficient for all phases of de-icing in addition to requiring lighter equipment than continuous heating devices.

Other results of the research show that two-thirds of the energy from heaters used to de-ice propellers is wasted in the blade rather than being used to melt ice. The study indicated that placing the heaters inside the blade may result in more effective ice protection than placing them outside.

The research was done with the aid of U.C.L.A.'s new Thermal Analyzer, a device which produces an electrical circuit analogous to thermal conditions of the plane surfaces.

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METALLURGY

Aluminum Scrap Yields Pure Aluminum

► ALUMINUM scrap containing silicon and iron can be made to yield its aluminum by a new U. S. Bureau of Mines process which involves dissolving.

The aluminum is dissolved in molten zinc and the zinc is then distilled from the aluminum. Both laboratory and pilot-plant distillation tests have been made.

To obtain pure aluminum by direct reduction of clay or siliceous bauxite in an electric furnace requires a practical, inexpensive method for refining aluminum-silicon alloy.

Most pure aluminum today is produced commercially by an electrolytic process, not by direct smelting of siliceous aluminum ores.

Containing information on tests made, a Bureau report covers the production of crude aluminum by carbothermic reduction, multi-stage reduction, and data on the boiling points of zinc-aluminum alloys. Copies may be obtained free from the Bureau of Mines, Pittsburgh, Pa.

The title is "Recovery of Aluminum from Crude Aluminum-Silicon Alloy by Extraction with Molten Zinc."

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BIOLOGY

"Osmotic Shocks" Burst Viruses, Leave Ghosts

► A NEW kind of killing agent, "osmotic shock," was reported by Dr. Thomas F. Anderson of the University of Pennsylvania at the meeting in Washington, D. C., of the Electron Microscope Society of America.

The victims of osmotic shock are special kinds of viruses which prey on bacteria. These viruses which attack some germs that attack man were formerly called bacteriophages. As scientists have learned more about them, that name has been discarded. The ones whose osmotic shock destruction was revealed by electron microscope pictures are called T2, T4, and T6.

The shock comes when the sodium chloride, or salt, solution the viruses have been living in is rapidly diluted with water or with solutions of ethylene glycol, glycine, glycerol, and either of the two sugars, glucose or sucrose. After the osmotic shock of this rapid dilution, virus "ghosts," empty head membranes with tails attached, are left. The membranes are the outside envelope of the virus, like the skin of a man.

"Presumably," Dr. Anderson said, "the virus heads swell when the osmotic pressure is suddenly reduced, and actually burst if the reduction is sufficiently large and sudden."

The small, odd-numbered viruses, T1, T3, and T7, were not affected by the osmotic shock. Electron microscope pictures of these show that they do not have membranes.

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CHEMISTRY-INDUSTRY

"Armalon" Is Used for Truck Seat Upholstery

► A TOUGH, strong and pliable plastic-covered fabric, first being applied to truck seat upholstery, has been developed by Du Pont by chemical changes in the ethylene chemical compounds such as are now coming into the synthetic resin field.

Fundamentally made from coal or petroleum, the new material, whose exact nature is still secret, has been trade-named "Armalon" ethylenic plastic.

Brawny truck drivers bounced by rough roads break the springs of the cushions they sit on before the new fabric wears through, it is claimed. The new plastic will not stiffen in use because it needs no plasticizer or softener in its manufacture. It gets along with sponge rubber, not affecting it or being affected by the anti-oxidant additions. Seven-year tests show that it can stand all sorts of weather.

First available for trucks, it will later be offered for other purposes.

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GENERAL SCIENCE

Awards Await Winners

The Ninth Annual Talent Search will be climaxed by the awarding of scholarships to the forty winners for further development of their science talent.

By MARGARET E. PATTERSON

► A BOY or girl in the senior class of the high school near you may be a future Einstein or Curie.

Those neighborhood kids you have watched grow up with their model airplanes, experimental animals, homemade telescopes, whining electronic gadgets and chemical conglomerations may be the ones who will be changing our world of the future.

A great search for youngsters with inventive flare and creative genius in science is now on.

Finding Scientists

You can help find these scientists of tomorrow by telling the talented boys and girls you know that scholarships for further training in science are waiting for them.

Like hundreds of others before them they may be nationally recognized and speeded along to scientific productiveness by winning in the Science Talent Search for the Westinghouse Science Scholarships, conducted annually by Science Clubs of America, administered by Science Service.

A total of 320 young scientists have been discovered through this search since 1942. These winners, along with 2,080 named as honorable mentions, are now enthusiastically pushing back science frontiers.

Youthful Scientists

Do high school seniors seem too young to be taken seriously as scientists? During the eight years of the Science Talent Search the records, made by the young scientists named for honors, have convinced scientists and the public in general that a high school senior with a talent for science is a rare and very valuable individual.

As a sample of their accomplishments let's look at the records of eight typical winners, only a few months or a few years removed from their high school graduation.

H. S. Graduate 1949—During three summer vacations a high school boy roamed on foot and by boat studying and collecting mollusks (clams, snails, etc.) on a tiny island off the Atlantic coast. When he wrote the results of his diligent explorations he had raised the number of known species on the island from 46 to 120. His careful analysis of the mollusks that once lived on that island and those that do now is so highly respected by authorities in the

field that the work is being published by a large eastern university. The 17-year-old boy, Dwight Taylor, is now a freshman at the University of Michigan, continuing his study of paleontology.

H. S. Graduate 1948—Making organic chemicals combine may be dangerous because of the constant threat that the reagents used can explode. A high school boy, whose hobby has been chemistry since he came to the U. S. A. from Hungary as a child, was intrigued by this problem. In 1948 he announced success in his quest for chemicals to replace the dangerous ones in a paper so important it was reported in full in two national magazines for professional chemists. The 17-year-old, Andrew Kende, is now a sophomore at the University of Chicago, majoring in organic chemistry.

H. S. Graduate 1947—At an age when most girls are still playing with dolls, one was learning about microscopic plants and animals. By the time she was a high school

senior her knowledge of *Drosophila melanogaster* (fruit flies to you) was so advanced she was the working partner of a college professor of genetics. Today ability like hers with micro-techniques assures you safety if you are prescribed either of two still rare, new antibiotics. All this past summer she has painstakingly standardized the reactions of bacteria to chloromycetin and neomycin at the Cold Spring Harbor station of the Carnegie Institution of Washington. She is Rada Demerec, 19-year-old junior at Swarthmore College, majoring in biology and considering medicine as a career.

H. S. Graduate 1946—Nuclear physics has interested one young man as long as he has known about science. By the time he was a high school senior, he had built his own cosmic ray counting apparatus and could compare its results favorably with that of equipment available commercially for many times the price.

When he entered the University of California at Berkeley he began to help in the Radiation Laboratory on assignments far beyond those usually given to a college freshman. Now a senior there, he holds the position of senior lab technician in the same laboratory where he has worked



RESEARCH CHEMIST—Mrs. Joan Kunkel Tanner, M.S., a winner in the 1943 Search, is a chemist for Eastman Kodak Company. Here she works with high-vacuum apparatus to remove solvents from gelatin solutions in her research to improve photographic film.



COMET DISCOVERY—The Harvard team which discovered the Bappu-Bok-Newkirk Comet examine the photographic plate of the new comet. They are Vainu Bappu (standing left), graduate student from India, Gordon Newkirk (standing right), 21-year-old college senior, 1946 winner, and Dr. Bart Bok, associate director of the Observatory.

off hours and summers for his whole college career.

The work David Cudaback does for an Atomic Energy Commission project is on the classified list so we can only guess at the seriousness of it.

H. S. Graduate 1945—On July 1, 1949, the USS Norton Sound left the West Coast bound for six weeks in the Pacific. On board, a party of scientists, jointly sponsored by Princeton University and the Office of Naval Research, was seeking information about cosmic rays in order to

shed further light on nuclear burst processes. Among them was Kirby Dwight, Jr., 21-year-old graduate physicist from Princeton, getting his first taste of in-the-field atomic research, and helping to find one more key to the riddle of atomic power.

H. S. Graduate 1944—Graduating from high school at 14 is looked upon with some wonder but when a boy does that and also wins one of the big scholarships in a national competition for young scientists the wonder grows.

An Alabama boy in 1944 had done such advanced work with thioplastics that even the judges of the Science Talent Search were amazed. He went on at his rapid stride to graduate at 17 from Massachusetts Institute of Technology and to accept a job with DuPont.

By going to school at night, he earned a master's degree at 18 from the University of Delaware. Then getting a leave of absence from his job he enrolled at Caltech. In August, 1949, at 20 he is Dr. Rodman Jenkins, Ph.D. in chemical engineering, to prove that promise at 14 can be a reality at 20.

H. S. Graduate 1943—Mathematics is basic to all sciences and often is so basic to new discoveries that it must be kept secret. This is true of projects like one being done for the Office of Naval Research at Cornell University. Working on it is Dr. Murray Rosenblatt, 23-year-old Ph.D. in mathematics from Cornell.

H. S. Graduate 1942—At the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics in Cleveland, Ohio, fuels adequate for jet planes must be perfected. Selecting, synthesizing and testing new and better hydrocarbons is the job of men like Dr. Wolf Karo, 25-year-old Ph.D. from Cornell University. Since his arrival from Germany shortly before World War II, he has never deviated from his goal of becoming an organic chemist.

New Search Begins

The Ninth Annual Science Talent Search, now on, will locate other young scientists like these spotted during the past eight years.

The 16,000 boys and girls expected to enter the competition this year have been busy with practical experience in science during their vacations and are now back at their high school studies. Seniors in public, private and parochial schools will report on the results of their investigations and experiments in a 1,000-word essay on "My Scientific Project," one of the requirements of the Science Talent Search which ends Dec. 27, 1949.

The 40 chosen as winners will be announced early in 1950 and will be invited to the five-day all-expenses paid Science Talent Institute in Washington, D. C., in March. Here one boy or girl will be selected to receive a Westinghouse Grand Science Scholarship of \$2,800; one of \$2,000 will go to the runner-up. Other trip winners

will receive scholarships ranging from \$100 to \$400, all made available through the Westinghouse Educational Foundation.

In 15 states where State Science Talent Searches have been set up to run concurrently with the national competition, the fortunate entrants will have a double chance of placing in the national or state contest and are thus assured of additional opportunity for college educations.

Successful Experiment

The Search was started as an experiment by Science Service and the Westinghouse Electric Corporation to provide an adequate supply of promising young scientists for the continuing development of American science.

The experiment has indicated clearly that talented young scientists can be located by the time they are high school seniors. Scholarships and recommendations have made it possible for hundreds of boys and girls, who might not otherwise have had the incentive or financial assistance, to continue their education in science and to develop further their rare gifts of science talent.

With this country thrust more and more into a position of world leadership in science this successful experiment is of even greater value to the strength and security of the United States than when it was originally planned.

Young Scientists Everywhere

Size of school and its geographical location seem to have very little to do with winning in the Science Talent Search. Promising young scientists appear to be almost everywhere in the U. S.

Winners receive handsome bronze plaques to present to their schools. Forty proud high school seniors will be giving them to their schools next spring at commencement time. Perhaps that high school near you will be getting one for the first time or adding a new one to its collection. They will signify 40 more boys and girls launched on careers of service through science.

Complete details of the Ninth Annual Science Talent Search may be obtained by writing to Science Clubs of America, 1719 N St., N. W., Washington 6, D. C.

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GENETICS TEACHING AIDS

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MEDICINE

Hormones Aid Arthritis

►HOPE for chemical conquest of arthritis and related diseases grows from encouraging results of a trial of three non-scarce hormone chemicals in treatment of the disease.

The chemicals used are male and female hormones or derivatives of these. Their names are: testosterone propionate, estradiol esters, and pregnenolone. They belong to a class of chemicals known as steroids. Steroid chemicals are also believed to be a possible starting source for cortisone, the adrenal cortical hormone which scientists at the Mayo Clinic discovered was effective in relieving arthritis pain and disability. Cortisone at present is synthesized from ox bile acids by a complicated process and is still very scarce.

The three sex hormone chemicals were given for from four to 12 weeks to 90 patients with rheumatoid arthritis. Of these, 81 "went into a remission," that is, were free of pain, swelling and morning stiffness and had a normal appetite and a sense of well-being.

These results are reported by Drs. William K. Ishmael, Arthur A. Hellbaum, John F. Kuhn and Miss Mary Duffy of the

McBride Clinic and the University of Oklahoma School of Medicine in the OKLAHOMA STATE MEDICAL JOURNAL.

Although the results are better than with any treatment previously used by the doctors, who have not yet used large doses of cortisone, they warn that the results and length of observation time "do not warrant at present the use of these substances as a 'treatment' or a 'cure'".

They caution further that these chemicals are "potentially dangerous when given over a long period of time." The value of the chemicals, in their opinion, is two-fold: 1. Since they are in plentiful supply and not too costly, they may provide a stop-gap treatment. 2. They may provide another clue to development of a real chemical remedy or cure for arthritis.

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CHEMISTRY

Heat, Oxygen Blamed for Color Fading of Juices

► HEAT and oxygen are the real culprits causing the fading of stored fruit juices,

although the blame is often put on light. Cool storage protects the color of fruit juice far better than dark storage, scientists at the Massachusetts Agricultural Experiment Station have reported.

Grape, tomato, cherry, currant, raspberry, strawberry and blueberry juices were studied for color changes after six months' storage. Those with naturally high color suffered the most, cherry, grape and tomato juices being the most stable.

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On This Week's Cover

► THE new supersonic jet fighter, the Vickers Supermarine 510, which was shown at the British Aircraft Constructors Display, Farnsborough, England, is claimed to be capable of reaching a speed faster than sound. The Royal Air Force is to be equipped with this aircraft which is still on the secret list.

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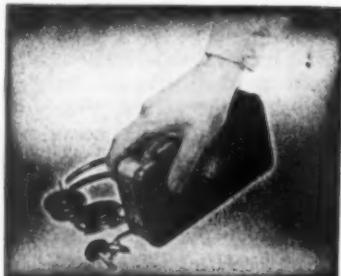
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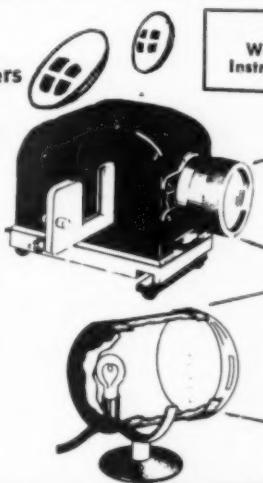
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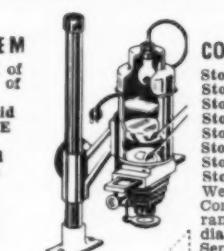
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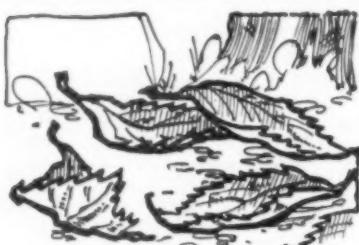
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Falling Leaves

► THE first leaf falls. Another follows. Then a third. Soon the leaves are falling in twos, threes, by the dozen, by the score.

They come soaring down in dancing zigzag flight. When the wind blows they fall faster, and skip along the ground.

A falling leaf brushes the face of a man and a sharp sadness grips his heart. The man feels, not a brown leaf, but portents of his own mortality. The falling, skipping, dancing leaves do not fill him with frolicsome gladness. They set him to brooding.

For the man the falling leaves are an ending. They are an ending not alone of summer and warm sun, of the season of quick vitality. They portend a larger ending, of a year, of a hope, of some aspiration perhaps that has gone another twelve-month unfulfilled.

The man whom fall makes sad is surely a poet. But the man who thinks of autumn as a termination, with equal certainty is no naturalist.

Autumn is not an end point, but a needful natural turning point. It is the season of fruition and of preparation. It is a time for garnering all the lush and lavish products of the growing season. And it is a time when Nature, like a provident housewife, begins to set her house in order for the winter that lies ahead, and for the spring that lies beyond. A man seeing the leaves fall would be wise to prepare for the winter as well.



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Green leaves are as vulnerable to frost bite as ears of corn and man. A man, perhaps preoccupied in philosophizing grandly on doleful misty matters, might scoff at talk of earmuffs and think it premature. But a tree, which has no cozy fire to scurry to when the air gets nippy, takes its measures early.

When the nights start to grow longer and chillier, the tree loses no time. All the liquid foodstuffs begin to drain out of the leaves, back into the limbs and trunk. The sugar, starch and protein that make the green leaf such a tasty tidbit to browsing animals are put into winter storage.

Then a chemical transformation takes place in the leaf. The green matter, the all-important chlorophyl that performs the miracle of turning sunlight into plant food, breaks down and becomes colorless. At this time the other colors, which have been in the leaf all the time but dominated by the larger amount of green, seem to burst forth riotously. The yellow, the reds, the purples, which turn autumn landscapes into speechless wonder, are microscopic bits of pigment or dissolved dyes in the cell-sap.

Meanwhile at the base of the stem of the leaf a double layer of a corky substance is forming. Eventually it splits, each half acting to bind up the open wound caused by the severing of the leaf from the branch.

The tree is sealed up for winter. The leaf, its usefulness over for the year, sails free, floating, planing, zigzagging downwards. The leaf falls, and it brushes the face of a man. The man feels, not a brown leaf, but a nameless portent in the autumn of his heart.

Science News Letter, October 15, 1949

MAINTENANT Les Livres Francais

Now you can obtain through Science Service the latest and best scientific books published in France. Just order the books listed here for your convenience, remitting to the Retail Book Department of Science Service. The books will be sent you by fast steamer, postpaid.

DIX ANS D'APPLICATION DE LA RADIOACTIVITE ARTIFICIELLE—Pierre Sue (with preface by M. Joliot Curie)—264 p. \$3.50. This work, which deals with the many ways in which radioisotopes are utilized, is of prime importance to American researchers who make use of this very new tool of science. Among the applications covered are the use of the radioisotope in chemical analysis, use of gamma rays in industry and metallurgy—a field rich in possibilities—use of radioactivity in biological research and in the treatment of cancer and other diseases, and use of radioactivity in tests of the efficacy of insecticides.

LES GRANDS COURANTS DE LA PENSEE MATHEMATIQUE—F. LeLionnais—533 p., \$3.50. This is an encyclopedic work written to be understandable to the layman. It covers not only logic and mathematics but also physical chemistry and biology. Forty-five eminent

scientists contribute to the volume, each writing on some branch of mathematics such as analogy, function, number, infinity, probability, and space and the interrelations with related branches of science such as pedagogy, logic and physics.

MECANIQUE ONDULATOIRE DU PHOTON ET THEORIE QUANTIQUE DES CHAMPS—L. de Broglie—208 p., illus., \$9.00. It is the author who has developed since 1934 the wave mechanics of the photon. In this work he brings together, compares, and amplifies results presented in previous publications, especially those which distinguish his theory from that of Jordan, Heisenberg and Pauli, the quantum theory of the electromagnetic field. The discussion is clearly presented and the author puts very well those questions that remain obscure in usual presentations.

LE POLISSAGE ELECTROLYTIQUE DES SURFACES METALLIQUES ET SES APPLICATIONS: Tome I—Aluminium, Magnesium, Alliages Legers—P. A. Jacquet—359 p., illus., \$12.00. It is rare that a technique issues from the laboratory to become generally known and to have developed such a multitude of industrial applications as was the case with electrolytic polishing. Previously, metal structure had to be studied only after the surface had been cleaned by chemical attack or by mechanical friction. Even then surface irregularities were likely to falsify microscopic examination. Electrolytic polishing opened up new possibilities in micrography. Metallurgists and industrialists will read this work with great interest.

Science News Letter, October 15, 1949

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FRACTURES—Paul B. Magnuson and James K. Stack—*Lippincott*, 5th ed., 537 p., illus., \$7.00. A standard reference book brought up to date in the light of newer knowledge in the field.

FRIENDLY CHINA—Bailey Willis—*Stanford University Press*, 312 p., illus., \$5.00. The final, posthumous book by a noted geologist and earthquake specialist. It is a sketch of the author's two-thousand mile walks through the interior of China under the auspices of the Carnegie Institution. Many lovely on-the-spot pencil sketches by the author are included.

INORGANIC CHEMISTRY IN PHARMACY—Lloyd M. Parks, Paul J. Janke, Loyd E. Harris, and John E. Christian—*Lippincott*, 298 p., illus., \$6.00. A textbook written with emphasis on the preparation, properties, testing and uses of inorganic chemicals used in pharmacy and medicine.

LIFE AMONG THE DOCTORS—Paul De Kruif—*Harcourt Brace*, 470 p., \$4.75. A chronicle of the fight by responsible men of medicine against human disease.

THE MEANING OF EVOLUTION: A study of the History of Life and Its Significance for Man—George Gaylord Simpson—*Yale University*

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THE PRE-ELECTION POLLS OF 1948: Report to the Committee on Analysis of Pre-election Polls and Forecasts—Frederick Mosteller and others—*Social Science Research Council*, 396 p., illus., paper, \$2.50; cloth, \$3.00. Based on extensive studies of data on the polls and the election.

HUMAN PATHOLOGY—Howard T. Karsner—*Lippincott*, 7th ed., 927 p., illus., \$12.00. The most extensive revision this standard reference book has had.

STUDIES IN HUMAN BEHAVIOR—Merle Lawrence—*Princeton University Press*, 181 p., illus., paper, \$3.50. A laboratory manual in general psychology including experiments with which the student can learn how his senses function and how his previous experience affects his perception, sometimes causing weird illusions. Through these experiments, he can learn why men behave as they do.

TAKING YOUR BABY'S PICTURE—Emanuele Stieri—*Greenberg*, 125 p., illus., \$2.95. How to catch those charming, natural looking pictures that every parent wants and how to develop and print them, too.

THE UNITED NATIONS: Four Years of Achievement—Department of State—*Gov't Printing Office*, 35 p., paper, 15 cents. Major actions during the past four years summarized.

YOUR ACHEs: What to do About Them—Dorothy Nye—*Funk & Wagnalls*, 80 p., illus., \$2.50. Some suggestions and exercises to aid in finding more enjoyment and less fatigue in your everyday work and play. The author is an authority on corrective exercises.

Science News Letter, October 15, 1949

AERONAUTICS

"Buzzing" by Pilots Should Be Reported

► THE United States government wants help in spotting reckless airplane pilots who "buzz" various objects or engage in other hazardous flying stunts. Procedures for reporting, in which the public is asked to participate, were announced by the Civil Aeronautics Administration.

Anyone who observes an airplane buzz-

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Science News Letter, October 15, 1949

Words in Science— BUTTERFLY-MOTH

► IT is not correct to assume that moths are only those pestiferous insects that devour a dress suit between formal parties.

Moths, as well as butterflies, can be beautiful. Here are some of the ways to tell them apart.

Butterflies have a club-shaped antenna with a knob on the end. Only a few rare tropical species of moths have this knob.

The pupae of butterflies are not protected by cocoons as are those of some moths.

Butterflies usually hold their wings up, when at rest. Moths generally hold them flat or fold them against the body.

Butterflies, as a rule, fly only in the daytime. Most moths are seen only at night.

Science News Letter, October 15, 1949

PHENOMENA, ATOMS AND MOLECULES

IRVING LANGMUIR

The Philosophical Library deems it a privilege to announce the forthcoming publication of Dr. Langmuir's work **PHENOMENA, ATOMS AND MOLECULES**. The eminent scholar, winner of the Nobel Prize and one of the country's pioneers in atomic research, has set down in this volume many of his thoughts, observations and conclusions.

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Among the many interesting, timely phases of Dr. Langmuir's observations are those concerning the present status and the possibilities of Soviet Russia's scientific research.

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• SNOW REMOVER to clean walks will clear a 16-inch path in snow up to 12 inches in depth, throwing the snow as much as 25 feet to one side. It is a two-wheel affair, with rubber tires and equipped with a 1.5-horsepower gasoline engine, and is guided by a handlebar from the rear.

Science News Letter, October 15, 1949

• WATER SKIS for walking on water, unlike types which can be used only when towed behind a speedboat, are of usual length and width but have increased bulk in depth. Fins prevent any tendency of the ski to go backwards in this recently patented device, and the thickness of the ski prevents sideward drift.

Science News Letter, October 15, 1949

• WATER COOLER for office use is a combination device which includes within its cabinet a spacious food or bottled drink storage compartment and three trays of ice cubes. The cooled drinking water is drawn from a faucet in a recess on one upright edge; the storage compartment is opened from the top.

Science News Letter, October 15, 1949

• LIGHTWEIGHT CHAIN SAW, shown in the picture, can be used at the top of a pole to cut a 12-inch tree limb 15 feet above



the ground. This electrically operated device, with pole removed, can be used as a hand saw. A small gasoline engine generator supplies energy, or household current can be used.

Science News Letter, October 15, 1949

• HEATED SHOE TREE for drying footwear after washing or dyeing uses an elec-

tric heating element inside the tree which is energized by the household current. The amount of heat created in this newly patented device is low to permit a slow drying.

Science News Letter, October 15, 1949

• PHOTO COPY OUTFIT, complete in one movable compartment that occupies the office space of an ordinary wardrobe, produces in a few seconds exact copies of letters, drawings, photos and forms up to legal size. No special dark room is required; the unit operates in subdued office light.

Science News Letter, October 15, 1949

• HOSE REEL, that is attached to the side of a building and to which the hose is permanently attached, permits unwinding as much or little of the hose as desired. Water passes through the unwound part; its leak-proof hose connection is reversible.

Science News Letter, October 15, 1949

• BUILDING MATERIAL of high elasticity, recently patented, is claimed as a superior product for shingles, wallboards and floor covering because it regains its original shape after being distorted by pressure. It is made of fibrous material blended with aluminum soap and a plasticizer.

Science News Letter, October 15, 1949

Do You Know?

Icebergs weighing 500,000 tons are not uncommon in the North Atlantic.

Some 3,200 American watch towers are maintained to spot forest fires.

Asbestos has been in use some 2,000 years in fire-protection.

North Carolina claims to have more kinds of trees and plants than any other state.

Some 25 years ago the Oil, Paint and Drug Reporter listed market prices for about 1,000 industrial chemicals; at present the number is over 5,500.

Only a remnant of the fur-bearing royal chinchilla of Peru is now left; these are high up in the Andes where law-breaking hunters find difficulty in reaching them.

The possibility of using carbon black to aid ice-breaking for navigation on rivers and in harbors is under investigation; carbon black on the ice would absorb heat from the sun and reduce the rate of ice growth, it is thought.

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